home energy makeover contest winners **case study**

The Brown Home in Los Angeles

SUPERVISORIAL DISTRICT 2 RESIDENT

What It Cost

Many homeowners begin with a 20% energy savings target.

Ms. Brown's upgrade included:

20%

*Cost-effective upgrades projected to achieve at least **20% energy savings** in this home*

Energy assessment	$250
Attic, crawl space and wall insulation upgrade with air sealing	$4,500
Subtotal investment	$4,750
Qualified Energy Upgrade California incentives	**$4,000***
Subtotal #1 out-of-pocket costs	$750

But she went a step further.

53%

*Additional upgrades projected to achieve over **53% energy savings** in this home*

Lennox heating and A/C system with duct enhancements and solar panels	$18,600
Pool pump upgrade	$1,600
Water heater upgrade	$1,350
Shower valves and other upgrades	$100
Subtotal additional investment	$21,650
Additional Energy Upgrade California incentives	**$4,000***
Subtotal #2 out-of-pocket costs	$17,650
Subtotal #1 out-of-pocket costs	$750
Total out-of-pocket costs	**$18,400**

Additional investments

Asbestos abatement	$750

*Check EnergyUpgradeCA.org/LACounty for current promotion.

Los Angeles resident Lisa Brown purchased her 1,700-square-foot home built in 1951 about five years ago. Ms. Brown spends approximately $2,465 annually for electricity and gas. In an effort to reduce her energy bills and improve the home's appearance, she recently replaced all of the windows. However, she did not see an improvement in her energy bills. But with Energy Upgrade California, she did!

Energy Upgrade California Home Energy Makeover

1. Comprehensive Energy Assessment

To provide a complete evaluation of the Brown home's energy use, **Building Doctors** conducted a comprehensive home energy assessment that included a blower door test, duct leakage test, carbon monoxide test and infrared imaging. Like most houses built before today's energy codes, this home had a 47-year-old furnace and window-installed air conditioners with no attic, wall or crawl space insulation.

Building Doctors is a Building Performance Institute (BPI) Accredited Company, so BPI provided a third-party inspection after all of the improvements were completed to ensure that the highest level of industry standards was followed.

2. Insulation with Air Sealing

Building Doctors installed insulation with air-sealing in the attic, walls and crawl space. Before adding insulation, they replaced five recessed ceiling lights with new Insulation Contact Air-Tight (ICAT) lights, and made sure that all penetrations between the attic floor and living area ceiling were sealed. The R-38 energy efficiency level of the new insulation brings the home into compliance with modern building energy codes.

Lisa Brown's home in Los Angeles

Making bore holes for the insulation tube

Blowing insulation into the attic

Then, **Building Doctors** drilled inconspicuous holes in the walls to pump cellulose insulation into the wall cavities up to an R-13 efficiency level. They also sealed and insulated the crawl space ceiling to an R-19 efficiency level so that air would not leak into the living space floor.

To further assist with controlling the home's air flow and quality, and since there were no bathroom fans in the home, **Building Doctors** installed new **Panasonic** Whispergreen units with built-in timer and moisture sensors. They also used rigid ducting sealed and insulated to an R-8 level to eliminate condensation and moisture-related issues in those ducts. These combined measures reduced the air exchange rate in the home.

3. Heating and Cooling System

Lennox Industries provided a SunSource® Home Energy System which included a 95% energy-efficient natural gas furnace, a 20-SEER, high-efficiency central air conditioning system, R-8 ducting and a 1 kW, 4-panel photovoltaic roof-mounted solar array.

Building Doctors removed the home's 47-year-old furnace from a central closet and relocated the new system to the attic. This upgrade provided Ms. Brown the added benefit of a new closet in the space formerly occupied by her old furnace. **Building Doctors** also removed the two window air conditioners and installed the central system's condenser outdoors.

Key Environmental Services performed an asbestos abatement of the home's existing ducting. Over 42% of the air that moved through the old heat pump's duct system was lost due to leaks, holes and poorly connected ducts—creating higher energy costs and lower comfort. **Building Doctors** redesigned and installed a new air-balanced ducting system that included increased air supply return and removal of three air supply vents. The new duct work was insulated to an R-8 efficiency level, reducing air leakage to 4% and reducing the building envelope leakage by 75%.

Plus, a programmable, touchscreen-thermostat donated by **Lennox** was installed by **Building Doctors** to be sure the system will operate at peak efficiency and can be adjusted to a pre-set schedule. As a result, the system doesn't operate as much when the occupants are asleep or away from home.

Rapid Duct Testing performed the Home Energy Rating System (HERS) testing as required by California building code whenever a heating system is replaced.

GreenPoint Rated Elements label improvements

GreenPoint rating and processing	$1,600
Plumbing labor	$1,000
Toilets, faucets, shower heads	$1,400
CO alarms	$50
Subtotal additional investment	$4,050
GreenPoint Rated Elements label rebate and LA bonus	**$900**
Total additional out-of-pocket	$3,150

Original crawl space

Crawl space with vapor barrier

GreenPoint Rated Improvements

Since Ms. Brown was already making energy improvements as part of Energy Upgrade California, she didn't have to make many additional improvements to achieve the GreenPoint Rated Elements label. **Harding Construction and Sustainable Solutions** helped Ms. Brown earn 37 points—well above the minimum 25 points required for the label.

GreenPoint Rating for the Brown home was provided by **Harding Construction and Sustainable Solutions**.

Energy Efficiency—18 points

All energy points were achieved through the Energy Upgrade California Advanced Upgrade Package.

Water Efficiency—5 points

Harding Construction and Sustainable Solutions suggested several water conserving measures that would help Ms. Brown save more money on her utility bills. Following these suggestions, **Building Doctors** upgraded the existing water heater with a .54 energy factor with a new **Rheem** Marathon natural gas water heater with a .67 energy factor. For safety reasons, the tank-storage water heater was relocated outdoors to remove a combustion appliance from the living space.

Building Doctors also replaced the home's showerheads with high performing models and the 1.6 gallon-per-flush (GPF) toilets with .94 GPF Sydney Smart Dual Flush Wash toilets donated by **Caroma**. These will produce a savings of 40%—well beyond the 1.28 GPF toilets now mandated in California.

In addition, **Building Doctors** installed a shower control valve. This valve turns the flow off automatically once the desired temperature is achieved and holds it until water is needed.

The in-ground pool pump was upgraded with a variable-speed model provided by **Pentair**. Pool pumps are energy-using devices that are often overlooked. Variable-speed models can save up to 25% over models that are just a few years old.

Indoor Air Quality—7 points

The air and duct sealing work completed as part of the energy-efficiency upgrades vastly improved the indoor air quality in Ms. Brown's home. And the addition of a new UL 2034 carbon monoxide monitor makes the home compliant with California code in effect as of July 1, 2011.

Volatile organic compounds (VOCs), often found in paints and other indoor materials, are a major indoor air quality concern in conventional buildings. The home's asbestos-insulated air duct system wasn't causing immediate health hazards, but it had been poorly designed. **Key Environmental** abated the asbestos fibers so it could be safely removed. Only low-emitting insulation was used for the new work.

The Brown Home in Los Angeles *(continued)*

Lisa Brown and the Building Doctors

Value Conclusion	
Pre-upgrade	$550,000
Post-upgrade	$580,000
Value contribution of energy upgrades	6%

Resource Efficiency—3 points

Harding Construction and Sustainable Solutions made sure that all cardboard, concrete and metal waste created during the upgrade was recycled. This is a required part of the GreenPoint Rated process and saves waste from ending up in our landfills. The house also already had durable stucco siding, so it received an automatic point for saving resources on maintenance.

Better Communities—4 points

Ms. Brown's home received points for green practices already in place that help create healthier, safer communities. These include being within walking distance of public transit and other important neighborhood services, which reduces car travel and creates a more vibrant community.

GreenPoint Rated Improvements

The GreenPoint Rated label is the mark of quality for green home upgrades. It verifies that your home upgrade was installed according to proven green standards, and can even improve your property value at time of sale. When you participate in GreenPoint Rated, you earn points for improvements that save energy, water, resources and indoor air quality.

Learn about GreenPoint Rated Improvements at GreenPointRated.com.

About Energy Upgrade California in Los Angeles County

Energy Upgrade California in Los Angeles County is a rebate and incentive program for homeowners to improve their homes' energy efficiency, save water and natural resources, lower utility bills, and create a healthier and more comfortable home through a home energy upgrade. Energy Upgrade California connects homeowners with local Participating Contractors who can complete their home energy upgrade and help them apply for rebates and incentives. Learn more at EnergyUpgradeCA.org/LACounty or call 1-877-785-2237.

MAKEOVER TEAM

CONTEST HOST AND ADMINISTRATOR
Los Angeles County Team

PARTICIPATING UTILITIES
Southern California Edison
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